

**URBAN ENVIRONMENTAL SERVICES
IN TRANSITION ECONOMIES:
A CASE STUDY OF IASI, ROMANIA**

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SECTION I:

Demand for Urban Environmental Services in Transitional Economies: An Introduction to the Case Study of Iasi, Romania

1. INTRODUCTION

As local governments in post-socialist countries adapt to democratic and market forces they must formulate new strategies for providing urban environmental services such as hot water, district heating, cold water, sewerage, and solid waste management. The old service strategy based on a philosophy of strict social control, entitlements, no private property, and central government financing is no longer viable. However, the era of socialism left many institutional remnants which challenge local officials as they attempt to reform existing service strategies. In this series of four policy briefs we present the economic principles needed to successfully reform urban service strategies, demonstrate how to identify and then collect the information needed to implement these economic principles, and derive a set of policy recommendations for local and central governments and for service providers. Our examples are based on a study of Iasi, Romania. Iasi is a city of 350,000 inhabitants facing many of the urban service problems common to cities in Central and Eastern Europe.

In this Section we introduce the Iasi case study and the three other policy briefs by discussing issues that are common to all urban environmental services in Iasi. In section 2 we discuss why a focus on urban environmental services is essential to a successful transition to a market economy and democratic society. We then discuss the concept of a service strategy and how socialism and recent reforms have affected service strategies in Romania in section 3. In section 4 we describe our research approach and the economic principles which have guided our research design. In section 5 we present general information on household demand for improved services and the institutional impediments to achieving these improved levels of service. We conclude in section 6 with several sector-wide policy recommendations.

2. THE IMPORTANCE OF URBAN ENVIRONMENTAL SERVICES

Urban environmental services are important for several reasons. First, they represent well over half of the total expenditures by local governments in Central and Eastern Europe. Thus, the financial health and vigor of local governments is tied to the effective provision of these capital-intensive services. Second, the health and welfare of households is directly linked to efficient provision of these services. This is especially true when the government is the provider of all urban environmental services and the absence of housing markets effectively makes households captive consumers. Third, the provision of these services has a tremendous impact on the quality of the urban environment. Fourth, because of their effect on the quality of life and their importance as production inputs, the provision of these services can determine how attractive a city is, thus affecting its competitive edge when attempting to lure new firms and investment — not to mention tourism — to its locale.

These points are well illustrated by Iasi. In 1995, total municipal expenditure on water-related services, heating, and solid waste services exceeded 60 percent of the annual municipal budget. Nonetheless, households continue to suffer from low or declining levels of service. Service levels for water, waste water, solid waste, and heating have declined from their already modest levels prior to the Revolution of 1989. Households now receive cold water 12-20 hours a day and hot water only 3-6 hours a day. Heating service, which is part of the district hot water system, has deteriorated in tandem with the hot water system. Both hot and cold water service are frequently interrupted by breaks in the water network that contribute to total losses of over 50 percent in the system. Finally, the quality of solid waste service has been strained as demonstrated by the fact that only 39 percent of households rate their service as "good" overall.

The urban environment in turn has been affected by declining service levels that lead to an increase in water, air and soil pollution and an increasingly littered and foul-smelling urban environment. Poorly treated sewage from Iasi remains the greatest source of water pollution to the Prut River watershed, a river shared by the Ukraine and the Republic of Moldova and a tributary of the Danube River. Intermittent water pressure creates health hazards as it causes sewage to seep into the water distribution network. The large losses in the water network lead to greater urban air pollution since twice as much energy is used to treat and transport *both* potable water and waste water. These losses also create political pressure to allocate scarce capital to expand raw water works. In addition, this lost water means unnecessarily low instream flows for aquatic plants and animals whose existence is already under extreme pressure. Uncollected municipal solid waste threatens public health and impedes surface drainage, while the presence of hazardous wastes have longer term consequences for the morbidity and mortality of humans as well as regional fauna and flora.

3. STRATEGIES OF SERVICE PROVISION

A service sector is made up of the producers, consumers and regulators of the service, private and public infrastructure, public fiscal policy, private markets as well as a set of legal and administrative guidelines. We use the concept of a service strategy to analyze the strengths and weaknesses associated with service provision for each service sector studied. Taken together, service sector participants and their related institutions express a service strategy that: 1) determines criteria by which service levels and coverage are set; 2) delineates property rights and related obligations for public and private infrastructure; 3) determines the method of infrastructure financing; and 4) determines the extent of cost recovery and thus the pricing policy.

Because these four components of a service strategy are interdependent, the guiding principles and assumptions of each have the potential to be in conflict with one another if there is not careful coordination of participants and institutions across the sector. Such coordination is critical since if even one component of the strategy is out of synch the service will not be sustainable. In the case of Eastern and Central Europe, we see local governments struggling to simultaneously reform and coordinate these service strategy components.

3.1 Transition Period Effects on Service Strategies in Romania

Prior to the Revolution in 1989, local service strategies in Romania were determined in large part by ministries of the central government. Service strategies were based on a paternalistic philosophy of entitlements which did not recognize consumer sovereignty. As a result, policy makers set levels of service based on consumption norms. All infrastructure, including the housing stock, was financed and owned by the state. Capital and other input costs were commonly subsidized. In practice this service strategy led to high social costs of provision and low service levels due to: 1) few incentives for consumers to conserve resources either by reducing water use or by properly maintaining indoor plumbing; 2) few incentives for producers to maintain and repair infrastructure; and 3) inadequate financing as central government authorities favored industrial production over urban services.

Since the Revolution in 1989, the central government has begun promulgating several legal and institutional reforms. First, it has recognized private property and has allowed for consumer sovereignty on questions of residential location. Second, decentralization laws have given the local governments the legal authority to manage their own affairs. Third, the local finance laws officially shifted the burden of financing most local services onto the local governments. Fourth, democratic reforms have meant that contested elections make local officials more accountable to voters and, thus, more sensitive to their preferences for improvements in municipal services.

These reforms have begun to affect the assumptions and premises that underpin existing services strategies by: 1) recognizing consumer sovereignty; 2) attempting to maximize social welfare (as opposed to simply meeting norms); 3) moving toward recovering capital, operation, and maintenance costs through reforms in pricing; and 4) more clearly delineating infrastructure that is privately owned from that which is publicly owned. However, several institutional features from the socialist era remain that impede improvements in service strategies. These include: 1) free-riding in consumer collectives whereby non-paying households raise the costs for other members; 2) legal statutes that poorly define responsibility for infrastructure maintenance along the distribution chain; 3) legal limits on recourse for non-payment by households; 4) the bundling of bills for diverse urban services into one; and 5) the design of service delivery systems premised on an entitlement philosophy. Finally, utilities in these transitional economies face the traditional challenge of accessing capital markets to upgrade service and increase coverage. As a result of these difficulties, local utilities have reduced non-labor operating inputs and postponed needed maintenance, thus, allowing service levels to decline in many cases.

3.2 Principles for Reforming Urban Environmental Service Strategies

We advocate two principles to ensure that households are as well off as possible given their financial resources and that services are financially sustainable. First, we propose the *beneficiary pays principle*. This principle requires that those who benefit from a service pay the full cost of providing the service through user fees or local taxes. Second, we propose the principle of *no taxation without representation*. This principle requires that: 1) household preferences should form the basis for the new service strategies and accompanying regulations since households pay for the service system, and 2) service providers should be held closely accountable to households.

In addition, the public sector as a whole needs to recognize and pursue several types of economic efficiency. The first is *allocative efficiency* which requires the government to selectively allocate financial resources across the urban environmental services so as to maximize the aggregate welfare of households. In the short run, this means that governments should invest in improving services in accordance with household priorities for improvements. In the long run, this means that the level of each service should be increased or decreased until the cost of additional supply capacity is just equal to what households are willing to pay for additional service.

The second type is *production efficiency* which requires that the managers of each service produce it at the lowest possible cost for a given level of output. This means reducing the costs of producing each unit by: 1) searching for ways to reduce labor, capital or other inputs given a production technology; 2) finding new production technologies; 3) clarifying property rights for infrastructure so as to stimulate improved maintenance; and 4) creating economic incentives to reduce consumer demand and, thus, reduce the cost of production (and the need for capacity expansion).

The third is *consumption efficiency* which requires that consumers be able to trade-off present expenditures for future expenditures. This means allowing consumers to borrow and lend money in capital markets. This is important for service strategies that require consumers to make large capital outlays for which they need loans such as for a sewer or water connection, a hot water heater or the purchase of water meters.

While the three associated policy briefs focus on ways of improving allocative efficiency, they also analyze institutional impediments to production efficiency and capital market barriers to consumption efficiency.

4. OUR RESEARCH APPROACH FOR THE URBAN SERVICES STUDY

To implement policies that improve allocative efficiency we need certain information about household preferences and willingness to pay. For urban environmental services we asked:

1. Which services do households want improved most?

For each service in that portfolio we then asked the questions:

2. Given that households will bear the costs of service provision, what level of service should local officials provide to make households most satisfied?

3. How can local officials minimize the social and financial costs of service provision through institutional reforms?

Our research focus was on obtaining information on household preferences for improvements in urban services. In order to do this, we also needed to identify both the current problems with the production and delivery of services as well as the menu of technically feasible improvements. Therefore, we began by interviewing officials at the Ministry of Waters, Forests and Environmental Protection, the national raw water producer (Apele Romane), the municipal cold water utility (RAJAC), the municipal hot water and heating utility (RAT), the municipal solid waste utility (CITADIN), the Mayor's office, the environmental protection agency (APM), and the housing (apartment) association administrators. In each case, we tried to identify the major problems with service provision and financing that they perceived and the types of household information which the service provider could use to solve these problems.

The centerpiece of our study, however, was an extensive survey administered to 1,218 randomly-chosen households in the city of Iasi. Before administering the survey, it underwent extensive revisions through focus groups and pretesting. From the interviewed households we obtained information on: 1) the state of existing services; 2) household attitudes and practices with regard to these services; and 3) households' preferences, and willingness to pay for improvements in these services. This information was then analyzed using a variety of statistical techniques in order to answer the policy questions presented above.

5. THE CITY OF IASI AND URBAN SERVICE PROVISION IN ROMANIA

Iasi was chosen as a case study because it is representative of other Romanian cities in terms of its population and corporate structure. Located in the Moldova region of Romania, Iasi is an industrial city with approximately 350,000 residents. Of these, 93 percent of households reported that they lived in apartment blocks and 7 percent reported that they lived in houses. In 1995, the average family had three members and lived in an apartment with 2 to 3 rooms. The average family had lived in their apartment for 16 years and the head of the household was 49 years old and had at least a secondary education. Usually, one household member was employed full-time, earning an average income of 200,000 lei (\$100) per month. The state sector employed 54 percent of our sample, 11 percent were either self-employed or in the private sector, 30 percent were pensioners, and 7 percent were either unemployed or students. These socio-economic characteristics significantly affected households' preferences and willingness to pay for improved services as we will discuss shortly.

As illustrated in Figure 1, several levels of government and many organizations are involved in the provision of hot water, cold water, waste-water treatment, and solid waste services in Iasi. In the central government, the Ministry of Public Works and Land Planning and Ministry of Finance regulate the local government, while the Ministry of Waters, Forests and Environmental Protection regulates Apele Romane which in turn provides raw water and controls waste-water discharges to water bodies. At the local level,

the service providers are the public utilities and are incorporated at either the county or city level. There is a county-level government led by the prefect that oversees county-wide public utilities and a city-level government led by the mayor which oversees the city-wide public utilities. In Iasi, cold water and waste-water treatment services are provided by RAJAC, a county-wide public utility, while hot water and solid waste services are provided by RAT and CITADIN, two city-wide public utilities.

Public utilities typically provide services to *associations* which are an intermediary between the public utilities and the consumer-household. Associations are legal entities organized by residency and might include several houses or several apartment buildings. A resident administrator manages the day-to-day operations of the association which include receiving bills from the public utilities and dispensing and collecting bills from households. In addition, administrators are responsible for accounting, common property repairs, and representing the association in legal matters. When we examine institutional impediments to policy reform we will return to the role of the associations.

6. HOUSEHOLD PREFERENCES FOR URBAN ENVIRONMENTAL SERVICES

We asked respondents to rank the services which they felt officials should make priorities for improvement. Figure 2 shows that households prefer improvements in hot and cold water service over improvements in waste-water treatment and solid waste services. As a first priority, we see that 34 and 36 percent of respondents, respectively, sought improvements in hot and cold water, these were followed by improvements in waste-water treatment (19 percent), and improvements in solid waste service (11 percent). For households' second priority, we see that hot water is slightly more important than cold water (35 versus 26 percent). Similarly, we see that improved solid waste service is considered a second priority by more households than is improved waste-water treatment (21 versus 17 percent). These relative priorities are supported by households' willingness to pay as discussed in Sections II and VI.

A household's ranking of service improvements is a function of: 1) the degree to which the service is under-provided (or rationed), and 2) the availability of substitutes for the service. For example, solid waste service is chosen as a top priority by only a few households because the current level of service is relatively good and there are substitutes (albeit illegal ones) to the municipal waste disposal service. In contrast, there are virtually no substitutes to public water services. The absence of private wells, the predominance of high-rise apartments, and highly polluted local surface water force households to rely entirely upon this publicly-provided service. Hot water is a priority over cold water because hot water is rationed to a greater extent than is cold water.

Through our statistical analysis we found that the extent of service rationing depended upon a household's location. Households residing on higher floors of an apartment building tended to prefer improvements in cold water service before any other service. This is because cold water pressure is low on higher floors. Households in densely populated neighborhoods tended to prefer improvements in hot water service over other services. This is because engineering efforts to boost cold water pressure in high density areas take pressure off hot water pipes leading to poor hot water service.

6.1 Household Priorities as a Function of Socio-economic Characteristics

We expected household preferences for improvements in services to be a function of a household's socio-economic characteristics. Using statistical analysis we found that:

- *Households with above-average income* tended to prefer improvements first in hot water service, followed by solid waste service, waste-water treatment, and finally cold water service. Wealthier households appear to have selected residences to meet their cold water needs by occupying lower

levels of larger buildings. However, these households still have their hot water and solid waste services rationed.

- *Households with many children* tended to prefer improvements in cold water service followed by hot water service and were often indifferent between improvements in solid waste collection and waste-water treatment. The composition of these households suggests that the relative demand for essential private goods such as cold and hot water would be greater than that for public goods such as waste-water treatment.
- *Households on pensions* tended to prefer improvements in cold water service and did not have a clear preference over the other services. Pensioners appear to have spartan tastes and, in contrast with the rest of the population, demand improvements in only the most essential private services.

7. INSTITUTIONAL IMPEDIMENTS TO REFORMING SERVICE STRATEGIES

Two key institutional features of the previously socialist countries which now hamper the financial sustainability of efforts to improve priority services are financial arrears and the presence of associations as intermediaries. We consider each in turn.

7.1 Financial Arrears due to Non-payment by Households

Perhaps the most serious sector-wide problem is that of financial arrears due to non-payment by consumers. The problem begins with the consumers and their associations which in 1995 consistently failed to pay approximately 30% of their monthly bill to the public utilities. This has led to financial arrears in the public utilities which then get passed upstream through the input chain. The city water and solid waste utilities are unable to fully pay other institutions, such as Apele Romane or the energy utility (RENEL), for their inputs. In turn, Apele Romane cannot fully pay RENEL for energy nor can RENEL fully pay Apele Romane for its use of raw water. As a result, these urban services currently operate in a kind of cooperative brinkmanship where each participant recognizes the other's limitation, but is periodically forced to exact repayment to cover operating costs.

Several factors have exacerbated the magnitude of non-payment by households. We illustrate these factors using examples from the water services. First, since the Revolution, incomes have fallen in real terms, while prices have risen. Over the last two years household expenditures on water and waste-water services have risen from 3 to 10 percent of monthly income due to the removal of subsidies on inputs and the increase in debt servicing for new loans. Second, the dismantling of the planned economy has eliminated the old system of coercion that induced households to pay their bills, but has not yet been replaced by other incentives. The association administrator, for example, can no longer have a household's unpaid bills taken out of their state salary. For non-payment, the primary recourse available to an association administrator is legal action, which typically costs the association the balance of the amount under litigation even if the court rules in favor of the association. Third, the socialist state's philosophy that these services are entitlements was embedded in the very design of the apartment buildings. As a result, the plumbing in buildings was designed without concern for measuring a household's consumption and without the possibility of disconnecting individual households from a service.

Fortunately, over 83 percent of households recognize that they are negatively affected by neighbors who do not pay their bills. Households identify the negative effect of non-payment by neighbors as: 1) a lower quality of service; 2) an increase in their financial burden; and 3) an increase in the probability that the entire association's service will be discontinued. When we asked households what would eliminate the problem of non-payment in their association, 32 percent said increases in the level of employment and

family incomes, 30 percent said increases in the vigilance with which administrators pursue non-paying households, and 21 percent said strengthening the legal action against non-paying households. Only 9 percent of households suggested evicting a non-paying household.

7.2 Associations as a Financial Intermediary

In market economies, it is often cost-effective to have economic agents provide services to expedite financial transactions. Such agents are called *intermediaries*, of which banks are an example. The current operation of the association as a financial intermediary creates several problems, however. First, most association administrators bundle the prices of up to ten services into a single bill. Without an itemized bill, households cannot become responsive to changes in prices nor can they incorporate this information into political discourse with elected officials. We found that less than 10 percent of households could tell us how much they paid each month for hot or cold water or solid waste service.

Second, the methods used by the associations to estimate a household's share of service costs violate a consumer's sovereignty by not allowing a household to choose its level of consumption. Rather than basing a household's monthly bill on actual consumption, the associations base a household's bill on per person norms (for hot and cold water and solid waste services) or on the square footage of a household's apartment (for heating service). This leads to considerable inequity since the actual level of service enjoyed by a household is determined primarily by the location of their apartment.

Third, another violation of consumer sovereignty occurs when non-payment by some households leads to a shortfall in the association's revenues. The current procedure for dealing with a shortfall is for an administrator to independently select the public utilities that will not be paid (thereby risking a termination of service) rather than considering households' preferences.

Fourth, many association administrators are not trained in accounting or asset management and therefore mismanage funds. The absence of training or oversight of administrators has led to a rash of criminal cases against them for embezzlement.

Fifth, association administrators are poorly equipped both legally and professionally to deal with non-payment by households. We found that only 28 percent of households rated their administrator as "good" at collecting bills from non-paying households.

Sixth, the association system is not managing its common property assets optimally. Interior and exterior common property in apartment buildings is deteriorating rapidly. This is because of: 1) poorly trained administrators; 2) a lack of access to capital markets; 3) poorly developed labor markets for tradesmen such as plumbers, masons, electricians, and carpenters; 4) non-payment by households which reduces funds administrators have at their disposal; and 5) insufficient residential sorting of households into like-minded neighborhoods.

8. POLICY RECOMMENDATIONS

We reserve our detailed policy recommendations for specific urban services for the accompanying policy briefs. Here we provide some general guidelines for reforming service strategies based on the issues raised in this introductory Section.

1. Local governments and ministries in the central government should continue to clarify: a) their fiscal and regulatory obligations regarding urban services; b) rules for access to national and international capital markets; and c) the management of regional natural resources such as surface and ground water, landfill space, and air quality.

2. Local governments should continue the process of reconciling pre-Revolutionary laws with recently passed reform laws that are designed to allow for: a) consumer sovereignty in household consumption decisions regarding service levels; b) full-cost resource pricing of urban services; c) incentives for households to conserve resources; and d) well-defined and transferable individual and common property rights so that housing markets develop efficiently.
3. Local governments should implement a set of strategies to reduce and eliminate non-payment problems through institutional reforms. These reforms should include: a) making the legal recourse for non-payment more effective and less expensive for associations; b) creating a credit rating system so that as credit markets develop the public sector can identify bad creditors, thus creating an incentive for paying utility bills; and c) altering building codes to require that all future residential units be designed to allow for metered consumption and disconnection if needed.
4. The central government should establish a training program and related certification requirements for all association administrators. Certification would ensure that administrators are capable in the areas of: a) financial accounting; b) real estate management; c) legal representation for the association; and d) routine maintenance and repairs of common property. Similarly, impediments to a private sector supply of knowledgeable plumbing services should be identified.

Figure 1
Institutions Involved in Urban Environmental Service Provision

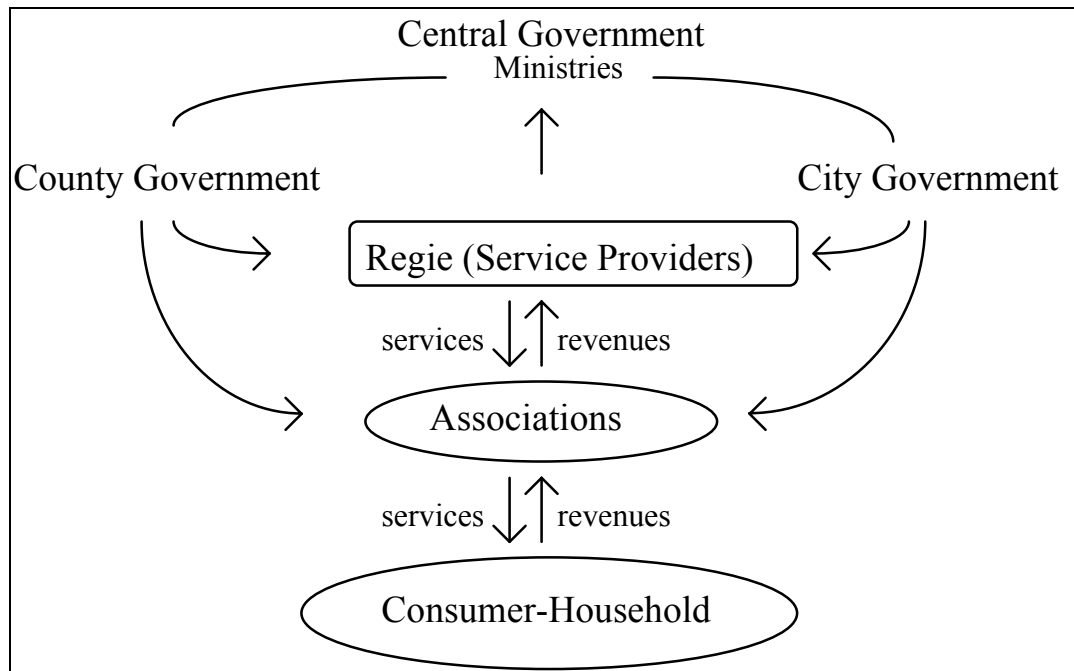
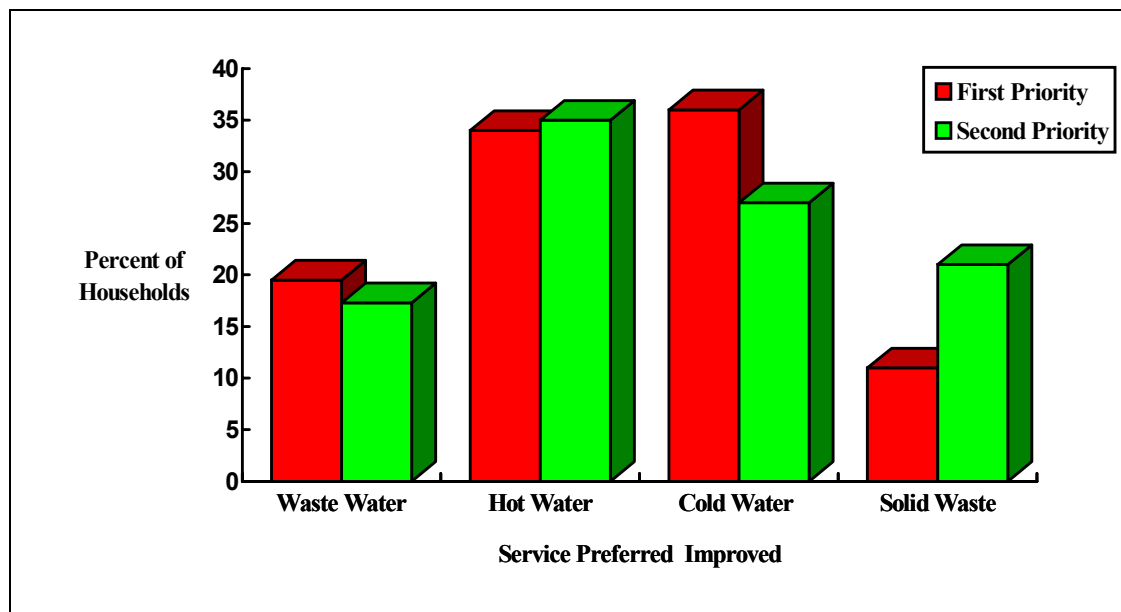


Figure 2
Households' First and Second Priorities for Improvement in Environmental Services



SECTION II:

Households' Evaluation of and Willingness to Pay for Improvements in Water Service: A Case Study of Iasi, Romania

1. INTRODUCTION

Under the socialist regime, service strategies for hot and cold water involved a complicated system of incentives and institutions which are now in disarray. As local governments adapt to democratic and market forces, they must formulate new service strategies to meet their community's needs. Household preferences should form the basis for these new service strategies since ultimately households will have to pay, through higher user fees and local taxes, for improvements in the existing system. To help policy makers understand household preferences and willingness to pay for improvements in water services, we administered an extensive survey to 1,218 households in Iasi, Romania. Refer to Section I for a description of our methodology.

In this Section, we describe the improvements in water services that households desire and propose policy reforms to achieve these improvements. In section 2, we describe the structure of the water sector, including how it is evolving as Romania develops its democratic and market institutions. In section 3, we present households' evaluation of existing cold and hot water services and explore the causes of failure in each service. In section 4, we discuss household preferences and willingness to pay for improvements in water services based on our survey findings. In sections 4 and 5, we focus on two types of policy reform. We first consider whether inadequate services can be improved by adjusting government expenditures and prices for the services. We do this by examining whether the current level of water services matches household demand for these services. We then identify institutional reforms which would improve services. In section 6, we offer specific recommendations.

2. THE STRUCTURE OF THE WATER SECTOR

Historically, several ministries in the central government controlled the water sector through a vertical command structure in which the ministries controlled the utilities who served local consumer collectives and industries. The Ministry of Waters, Forests and Environmental Protection, through the national water utility (Apele Romane), sold raw water to RAJAC, the county-wide water utility in Iasi and received treated waste water from RAJAC. Meanwhile, the Ministry of Public Works and Land Planning, in collaboration with the Ministry of Finance, provided capital for upgrading service levels, expanding service coverage, and developing new water sources. See Figure 1 for an overview of the water sector in Iasi.

Although uncertainty remains about the new structure of the water sector, recent decentralization and public finance laws have clearly shifted the planning and fiscal authority away from the ministries and onto the water utilities. It remains unclear, however, what regional role the ministries will play in: 1) allocating raw water; 2) managing the assimilative capacity of surface water for wastewater; and 3) facilitating utilities' access to new sources of national and international investment capital.

What is less likely to change in the near future is the relationship between the utilities and their consumers. After treating the raw water, RAJAC sells it to consumer collectives, industry and RAT, the city-wide hot water utility. By law, RAJAC must price its water to cover its variable costs of production in addition to a five percent mark-up for profit. RAT receives the treated water in order to produce hot water for indoor use and heating. A single co-generation plant produces hot water for Iasi; super-heated water is piped out to "thermal points" where it is used to heat cold water in two circuits. One circuit provides hot water for indoor use by consumers, and the other circuit provides hot water for heating

residential radiators. Like RAJAC, RAT prices hot water and heating to cover its variable costs of production (primarily water and energy), plus a five percent profit.

Both RAJAC and RAT sell to consumer collectives known as associations. Associations vary tremendously in size and tend to include all residents in proximate apartment blocks or houses. These associations act as institutional intermediaries between the utilities and the households. Typically, an association administrator receives each utility's bill to which he applies a formula to calculate each household's bill. Households then pay the administrator who, in turn, pays the respective utilities. Administrators also have the important responsibility of maintaining common property piping for hot and cold water as well as sewer piping. RAJAC also charges the associations for the cost of waste-water collection and treatment. RAJAC returns the treated wastewater to local surface water, which is under Apele Romane's management. The Water Department through Apele Romane monitors waste-water effluent and enforces a system of standards and fines.

3. HOUSEHOLDS' EVALUATION OF WATER SERVICES

We begin by identifying the symptoms of service failure so that we can evaluate and recommend reforms of inappropriate policies. The service strategy in this sector is made up of a set of policies designed to provide three types of services. These include: *water supply services* (which affect the frequency, pressure, and quality of water supply), *maintenance services* (which affect the performance of the network, common property piping, and private plumbing), and *financial services* (which affect the calculation, distribution, and collection of bills). The provision of these services in Iasi involves a range of participants including the cold water utility, the hot water utility, the association administrator, the private sector, and households. We asked households to evaluate the efficacy of these services.

3.1 Water Supply Services

RAJAC supplies cold water and RAT supplies hot water. Households reported that cold water service was supplied far more often than was hot water service; the average daily frequency of hot and cold water service is shown in Figure 2. Households reported that cold water arrived an average of 16 hours every day, which is consistent with RAJAC's estimates. Only 20 percent of households reported receiving cold water less than 2 hours a day, while 60 percent of households received it more than 12 hours a day. In contrast, households reported that they received hot water an average of 7.8 hours *every other day* or about 3.5 hour per day. This approximates the RAT claim that 60 percent of households received at least some hot water every day.

Not surprisingly, 60 percent of households rated the frequency of cold water supply "good," while only 37 percent of households rated the frequency of hot water supply as "good." These ratings suggest that the quantity of hot water supplied is in greater need of improvement. When asked which service should be improved if the government could improve only one, 41 percent chose hot water. Surprisingly, although a majority of households rated the frequency of cold water supply as "good," households ranked it as their second priority if only one service could be improved. This suggests that households viewed aspects of cold water provision, other than the quantity supplied, as highly inadequate.

3.2 Services Related to Maintenance

The utilities maintain the water supply network, the association maintains common property piping, and households maintain indoor plumbing. According to a number of indicators, households' assessment of maintenance services was mixed.

The Maintenance of the Network. One indicator of the level of network maintenance is water quality. Less than 50 percent of households rated the color and smell of cold water as "good," and only 51 percent said the taste of cold water was "good." Poor water quality is due in part to a drop in pressure in the piping each night as service is terminated. This drop in pressure is exacerbated by breaches in the network which allow unclean water to flow back into the network.

Service interruptions are another indicator of the quality of network maintenance. Over 46 percent of households reported that their cold water service was frequently interrupted, forcing households to undertake various coping strategies. Over 94 percent of households reported that their strategy for coping with announced interruptions of short duration was to fill bathtubs and containers, but during lengthy or unannounced interruptions 73 percent of households reported traveling to water sources outside their residence. Fortunately other indicators of network maintenance were positive. A majority of households (67 percent) viewed cold water as healthy and the temperature of hot water as good (66 percent). Similarly, 65 and 63 percent of households reported that hot and cold water pressure were good when water was supplied.

The Maintenance of Common Property Piping and Indoor Plumbing. Households reported that association administrators generally failed to undertake routine maintenance of common property piping. Moreover, in times of crisis such as a broken pipe, over 36 percent of households rated administrators' responsiveness as "poor." However, households did not adequately maintain their indoor plumbing either. We found that over 70 percent of households had at least one plumbing fixture that leaked constantly. This provides tentative support for RAJAC's claim that a substantial portion of water is lost indoors.

Administrators and households have become increasingly dependent upon the private sector for repair services. Unfortunately, over 51 percent of households rated the availability of plumbing services as "poor." This is due to the increasing demand for plumbers and the under-supply of them by a nascent labor market.

3.3 Financial and Billing Services

Billing services are provided by both the association administrators and the utilities. The association administrators provide accounting services to households by estimating, distributing, and collecting households' water bills each month. Only 28 percent and 34 percent, respectively, rated their administrators as "good" at bill processing (calculation and distribution) or bill collection and payment. However, by far the greatest complaint about water service was the way in which RAJAC calculates an association's total water bill. Generally, RAJAC bases its bill on a bulk meter reading taken from a branch line that connects an association or a group of associations to the network.

Billing for Lost Water. Over 68 percent of households residing in apartments reported being dissatisfied with the way their water bill was calculated. Of these, over 81 percent stated they were charged for more water than they actually consumed, 13 percent said the per unit price was too high, and 6 percent gave other reasons. Similar complaints were expressed by households that resided in houses. This ubiquitous complaint arises because most households are charged for between 12 and 18 cubic meters per capita per month while actual consumption ranges between 7 and 9 cubic meters. Per capita consumption in Western Europe averages 7.9 cubic meters. RAJAC acknowledges that households are billed for more water than they consume, but claims it delivers this quantity of water to the associations. RAJAC explains the discrepancy between the amount of water delivered and that actually consumed by pointing to high levels of losses in indoor plumbing and household waste.

Free-Riding by Neighbors. Over 33 percent of households in most associations do not pay their water bills. Over 83 percent of households felt that they were negatively affected by neighbors who did not pay their bills. They recognized that non-payment by neighbors: 1) decreased the quality of their water service, 2) increased their own fiscal burden, and 3) increased the probability that the entire association's water service would be disconnected. When households were asked what would eliminate the problem of non-payment in the association, 32 percent said increases in the level of employment and family incomes, 30 percent said increases in the vigilance with which administrators pursue non-paying households, and 21 percent said strengthening the legal action against non-paying households. Only 9 percent of households suggested evicting a non-paying household. Curiously, over 67 percent of households in associations with businesses that operated on the ground floor felt that businesses did not pay their fair share of water and other bills.

3.4 Symptoms and Their Underlying Causes

Some of these service failures can be addressed by the utilities by providing a higher level of service, while other service failures require changing existing institutional arrangements. In section 4, we consider household willingness to pay for improved cold and hot water service. We also evaluate alternative pricing methods to determine whether increasing the level of water service and switching to an average-cost pricing formula is economically efficient and financially sustainable. In section 5, we consider ways of modifying institutional arrangements to improve service provision.

4. UNDERSTANDING HOUSEHOLD WILLINGNESS TO PAY FOR IMPROVED LEVELS OF SERVICE

Are households willing to pay for higher levels of service? To find out, we carefully described hypothetical, but realistic improvements in the service and explained the expected cost increases before asking households whether they would be willing to incur these cost increases in return for a higher service level. Before presenting and interpreting households' stated willingness to pay for improvements, we must consider: 1) households' perceptions about the cost of service provision, and 2) whether we are valuing the current level of service or changes in the current level of service.

4.1 Recent Trends in Service Prices and Household Protests

In the early 1990s, hot and cold water as well as sewerage services cost the average household less than one percent of their monthly income. Recently, however, this has changed. Our survey results suggest that the average family subsisted in 1995 on a total monthly income of 300,000 lei (US\$150). We see in Figure 3 that in mid-1994 the average household spent approximately 10,000 lei on these services or 3 percent of their income.

By mid-1995, increases in the energy costs for hot water production by RAT and new debt servicing by RAJAC had pushed this figure toward 30,000 lei per month or 10 percent of a typical family's income. By international standards, this is an extraordinarily high percentage of total income to spend on water services. Therefore, it is not surprising that rates of non-payment by households have skyrocketed from 1994 to 1996 as incomes have remained constant. This trend in prices and rates of non-payment will be especially important when we examine the reasons some households are willing to pay nothing for improved services.

4.2 Re-interpreting Current Expenditure in the Presence of Bundling Bills

We know from engineering estimates that at the time of the survey the average household with three members paid 300 lei per cubic meter of cold water. Assuming that each household member actually

consumes 7.9 cubic meters per month (the West European norm) this amounts to 2,370 lei per person or 7,347 lei per family. In reality, each person is charged for approximately 12 cubic meters per month and therefore pays approximately 3,600 lei per person or 11,160 lei per family per month. We estimated that the average household member paid 1,500 lei for hot water per month in July, meaning that the average family paid 4,650 lei per month.

However, less than 10 percent of households could estimate how much they currently paid each month for hot or cold water service - and less than 5 percent estimated their costs correctly. This is because their association administrator bundles the costs of between 7 and 10 services into one monthly bill - typically without itemizing the costs of each service. We typically assume that households' current level of payments represents a lower bound on the amount they are willing to pay for a service. However, because households do not know how much they pay for each service, we cannot use current expenditures to infer a lower bound on their willingness to pay. At the current level and cost of the service, households might refuse to pay the itemized amount if given the choice or they might be willing to pay more. We do not know. All that we can infer from the current expenditures is that 70 percent of households are willing to pay for the entire bundle of services they receive.

4.3 Interpreting Willingness-to-Pay Estimates for Flat-Rate Pricing Policies

The flat-rate pricing policy, combined with the historic policy of entitlement to water, has caused the majority of households to view water service as a non-excludable amenity that is consumed jointly with their purchase of a residential location. As a result, many households believe that the value of the existing level of service is capitalized into the value of their apartment. This would not be true if households had a choice of service levels and paid the full resource cost of the service.

Ideally, we would like to know the total value of the current level of service plus the value of the increase in service levels. Unfortunately, no single method of valuation effectively provides both. We chose to measure the value households placed on a *change* in their current level of service, rather than the value of their current level of service itself. In the contingent valuation component of our survey, we described the improved level of service and asked households how much they valued that new level of service. This allows for two interpretations of a household's willingness to pay. If the service is either not provided or provided at a very low level *and* the improvement is very large, then a household's stated willingness to pay approximates the full value of a service. We will see that this is the case for both hot water and switching to an average-cost pricing method. If the current level of service is high *and* the improvement is relatively small, then a household's stated willingness to pay for an improvement represents only the incremental improvement described - which is likely to be a fraction of the total value of the service level.

4.4 Willingness to Pay for Improvements in Cold Water Service

To evaluate households' willingness to pay for improvements in the supply of cold water, we presented households with a scenario that described improvements in only the quantity and quality aspects of their current service. As we described it, the improved service would supply water: 1) 24 hours day, every day, 2) with adequate pressure, and 3) with improved color and purity. Households were asked to assume that they would be billed for only the water they used, but were told this meant they would also have to bear the cost of any plumbing repairs that were needed. They were told that they would have the opportunity to express their preferences for changes in the current method of billing later.

We presented the 539 households who indicated they received less than full service in the morning, afternoon, and evening with the above scenario. We found that the average willingness to pay was 7,143 lei per family per month. Our statistical analysis suggests that a household's willingness to pay is positively correlated with income, years of education, family size, and the floor on which one lives.

Willingness to pay for improved cold water service is negatively correlated with the respondent's age. Table 1 provides evidence that households' willingness to pay varied with socio-economic characteristics as we would expect.

We then asked those whose willingness to pay was zero why they were willing to pay nothing for improved service. Of 539 households, there were 246 zero bids. Over 31 percent of these reported that the increase in the monthly tariff would be too high, similarly 21 percent reported they could not afford an increase in prices. These responses accord with the fact that 30 percent of households do not pay their water bill currently. Over 29 percent reported they were unwilling to pay more because they were satisfied with less than 24-hour service. Households appeared to find the willingness-to-pay scenario plausible; only 6 percent refused to pay because they did not believe the utility could achieve the improved service level.

Under these circumstances, households' willingness to pay of 7,143 lei represents the value of both an improvement in the quality of the water they receive already and an additional 4 to 6 hours of service a day. Can the costs of such an improvement be covered by households' current willingness to pay? Under the current circumstances, the answer appears to be no. First, notice that at the current price of 300 lei per cubic meter, if each member of the average household consumed 7.9 cubic meters a month the average bill would be 7,347 lei per family. This would be good news if one assumed that the current price of 300 lei per cubic meter would support the improved level of service since all costs could be covered. Unfortunately, the improved level of service is estimated to cost at least 450 lei per cubic meter. This would require the average household to be willing to pay 11,021 lei per month. Under current conditions, this evidence suggests that households will not be willing to pay for an improvement in the level of cold water service.

4.5 Willingness to Pay for Improvements in Hot Water Service

To evaluate the demand for improvements in hot water supply, we again presented households with a willingness-to-pay scenario. As we presented it, the improved service would: 1) provide hot water 24 hours a day, every day; 2) provide adequate pressure; and 3) ensure the temperature is regulated so that it is neither too hot nor too cold. We presented this description of the improved service to the 1,187 households who indicated that their hot water service was inadequate.

The average willingness to pay of all households was 4,907 lei per family per month. Our statistical analysis found that a household's willingness to pay was positively correlated with its income, level of education, household size, and the number of floors in the building. As with cold water, willingness to pay for hot water was negatively correlated with a respondent's age and the frequency of hot water supply. See Table 2.

When households reported they were willing to pay nothing we asked them why. Of the 1,187 households, 549 were willing to pay nothing for improved service. Over 48 percent of these households reported that they were satisfied with their current level of service. Over 22 percent reported that the cost of the improved service was too high, while 17 percent said they could not afford the increase. Again 6 percent of these households reported they were unwilling to pay anything for an improvement because they did not believe the utility could achieve the described improvement.

Because hot water service is sporadic and infrequent, it is difficult to estimate the quantity of hot water consumed per person each month. The chief engineer for RAT reported each person consumed 4 cubic meters per month or 12 cubic meters per family per month. We see that households are willing to pay 4,907 lei for improved service. If the engineering and willingness-to-pay estimates are true, this suggests that households would be willing to pay approximately 500 lei per cubic meter for hot water. It is worth

noting that this is higher than households' average expenditures on hot water (4,000 lei per family). The evidence suggests that service levels and user fees could be adjusted upward slightly and households would be made better off. However, before RAT increases expenditures to improve service levels, RAT and the local government should consider institutional and managerial reforms that could lead to lower production costs.

4.6 Willingness to Pay for Improved Billing Methods

Over 68 percent of households reported being dissatisfied with the way in which their monthly water bill was calculated. We offered households a new way of calculating their bill each month. See Section III for a detailed discussion of this problem; here we provide only an overview of our findings. The alternative method of bill calculation relies on average-cost pricing and requires metering consumption. The cost of these alternative methods of billing varied greatly depending upon the type of metering (group versus individual) and, when metering individual consumption, the type of housing (detached homes versus apartments).

We offered households two willingness-to-pay scenarios, one based on metering the consumption of all families on a stairwell and the other based on metering the consumption of each family individually. For stairwells, we asked households if they would be willing to make a one-time contribution of 20,000 lei to have their association administrator coordinate the purchase and installation of meters in accordance with the water utilities' requirements. At a cost of up to 200,000 lei to meter an individual household's consumption, it became very clear that households would not be able to pay the full cost up front. Therefore, we presented households with four financing options, three of which were based on 10-percent interest with large variations in the required down payment (20,000-60,000 lei), the monthly payment (6,800-13,300 lei) and the repayment period (3-10 years). The few households who resided in houses were offered a similar set of financing scenarios.

We found that in the case of metering the stairwells over 71 percent of households said they would make a one-time payment of 20,000 lei to alter their current method of billing. However, slightly more households (74 percent) said they were willing to pay to meter their own consumption. Households were then asked to rank order the four financing options presented to them. Over 72 percent of households chose the financing option with the lowest down payment (20,000 lei) and monthly payment (6,800 lei), and the longest repayment period (10 years). When asked if the household would actually accept their first choice of financing options and pay off the cost of installing meters over 74 percent agreed. Of those who refused to accept their first choice of financing options, 62 percent reported they did so because metering was too expensive, while 20 percent felt it was the utilities' responsibility to provide meters. In short, we see that households have a substantial and untapped willingness to pay for switching from the current method of billing to a method of billing based on metered consumption.

5. POLICY ISSUES AND INSTITUTIONAL REFORMS

In the previous section we considered ways of improving services by changing in the levels of investment in services and pricing policies. In this section, we consider ways of improving services by altering the incentives and institutions that influence producers, consumers, and regulators. Within the water sector, four types of institutional reforms are needed: 1) reform in pricing and billing procedures; 2) reform of the system of hot water supply; 3) reform of the role of the association in water provision; and 4) the creation and strengthening of incentives to produce and consume water efficiently. Because of the powerful effect of pricing and billing practices on the effectiveness of the service strategy, these are treated in detail in Section III instead of here.

5.1 Institutional Reforms for Hot Water Supply

The low level of service provided by the hot water utility, RAT, can be explained in part by the position it occupies within the local institutional structure. RAT depends on other utilities for all of its inputs - its only value-added being to combine these inputs. As a result, RAT has no choice but to pass on to consumers all quantity and quality inadequacies and price increases associated with the energy utility, RENEL, and the cold water utility, RAJAC. For example, RAT notes that RAJAC does not respect its schedule of water delivery nor is the pressure of the cold water consistently adequate.

RAT is likely to encounter unique challenges and choices as the transition proceeds. First, RAT is saddled with a decrepit distribution system; however, unlike a county-wide utility like RAJAC, RAT (as only a city-wide utility) is likely to have greater difficulty accessing the national and international capital markets. Second, it also experiences a 30- percent non-payment rate. Yet, because indoor hot water is viewed more as a “luxury” than an “essential” service, RAT’s threat to terminate service is less likely to produce higher revenues flows as compared to similar threats by the cold water or energy utilities. This is not true in the winter when RAT’s heating services is considered essential to every household.

However, RAT’s greatest problems are likely to lie in the future. First, if RAT’s service levels remain low as household incomes grow, households will simply purchase their own equipment to heat water indoors and heat their homes using either gas or electricity rather than radiators. The adoption of substitutes for RAT’s services will mean lower revenues flows - a bad sign for a utility that depends on increasing returns to scale to cover its maintenance and debt-servicing costs. Also, this trend means that RAT’s consumer base will increasingly be made up of the relatively poorer segment of society, including pensioners, which suggests higher rates of non-payment.

In addition to the effects of rising incomes, RAT and local government officials must consider how to approach the inevitable suburbanization that will occur in the coming decade. Will RAT extend heating and hot water services to the new suburbs of Iasi? If so, how will it finance the massive amounts of capital needed to provide such service? If not, will the relatively poorer consumers that will remain in the city center provide an adequate revenue base to allow it to cover its costs?

RAT could pursue three general reform strategies. First, it could remain a separate utility and attempt to upgrade its services and maintain its consumer base in the future. Second, it could combine with another utility such as RAJAC in an effort to strengthen its institutional position and profile in both the capital and consumer markets. Indeed over 83 percent of households stated they favored uniting RAJAC and RAT into one utility, presumably to improve hot water service. Third, RAT could be gradually phased out all together and households could be encouraged to adopt technologies that allowed them to provide heating and hot water for themselves as is done in most of Western Europe. While the present study was not designed to resolve this issue, the evidence we collected does suggest that RAT will have to take decisive action to maintain its base of consumers and, thus, its financial sustainability.

5.2 Reforming the Role of Associations

Because RAJAC’s legal responsibilities for water provision literally stop at the physical boundary of the association, the associations are likely to continue to play a critical role in the provision of water services. This division of legal and physical responsibilities for water provision is a remnant of the socialist system in which associations - as consumer collectives - had considerable legal standing. Although the typical Western model of the consumer-utility relationship is one of direct interaction, in the post-socialist era RAJAC is not eager to spread its limited resources even further by assuming the responsibilities performed by association administrators.

As currently defined, the associations' responsibilities are numerous and may even expand as the transition proceeds. First, acting as a financial intermediary for the consumer, the association is billed by RAJAC and pays RAJAC. This entails the additional responsibilities of estimating, distributing, and collecting bills from households. Second, the association administrators are responsible for the legal prosecution of households who fail to pay their portion of the cold water, hot water, heating or sewerage bills. Third, administrators are responsible for maintaining and repairing common property piping for cold water, hot water, heating, and sewerage. Fourth, in the event that water consumption is metered at either the level of a stairwell or a household, the administrator will probably be responsible for reading water meters and billing for actual consumption.

Where are reforms needed to improve the performance of administrators' support of water services? Our survey revealed the need to improve administrators': 1) accounting and financial management skills to improve billing practices; 2) legal skills to decrease the level of non-payment; and 3) knowledge of the maintenance and repair of indoor plumbing and ability to better manage plumbers and plan for major capital investments in their building(s). Procedurally, administrators need to itemize households' bills to make the pricing policies of the utilities more transparent and households more responsive to these policies. Finally, administrators should develop the capacity to convey their needs to policy makers, making politicians more aware of the consequences that reforms have on their consumer collective.

Aside from improved training, there are other institutional reforms that would strengthen the capabilities of an association. First, implementing a voluntary system of certification for administrators would ensure each had the minimum necessary skills and decrease the likelihood of corruption as well as allowing households to know whether their administrator is qualified. Second, the formation of a membership organization for associations that would retain legal, construction, and engineering experts which administrators could call upon for advice as needed may make such expertise more affordable and enhance the decision-making capabilities within associations.

5.3 Reforms Aimed at Conserving Water

Both the financial and hydrological sustainability of the water system are threatened by the high level of water losses. While most of the policy reforms discussed in this and the following policy brief create incentives to reduce water losses, the problem of water loss is important enough to highlight the incentives needed for consumers and producers. The First and foremost reform needs to be a move toward full-cost resource pricing for hot and cold water service. This will require improved metering. A better pricing formula will create incentives for associations and households to maintain their plumbing and consume water wisely. To be successful, associations and households must have access to trained plumbers and associations must be functioning such that they are able to finance and maintain their communal capital. This means not only having some technical expertise, but also reducing high levels of non-payment. Similar incentives must also be created for the producer by reforming the regulations with which it complies. One improvement in these regulations would be to disallow the 5 percent profit on lost water that RAJAC is currently allowed to incorporate into its pricing formula. These reforms for both consumers and producers require a more developed system of metering.

6. RECOMMENDATIONS

1. Establish a commission to develop a ten-year plan for RAT that will either strengthen its level of service and market share or gradually reduce its level and geographical scope of service. This commission should carefully contrast RAT's expected performance with households' increasing ability to find private sector substitutes for its services as real incomes rise. Any reform of RAT's service will require an improvement in the flow of water from RAJAC to RAT.

2. Carefully take into account household budget constraints when making new investment decisions. Our results suggest that households are now paying on average 10 percent of their income for hot and cold water. If prices continue to increase rapidly, it is likely that non-payment will increase and total revenues may fall.
3. Evaluate raising both the level of service and price of hot water. Our results suggest many households are willing to pay an increase of 5-15 percent for improved service and that RAT could increase service levels through both better scheduling of inputs from the energy and cold water utilities and improved system maintenance.
4. Implement a more aggressive metering program. Our results reveal that households are most dissatisfied with the method of billing used by RAJAC. Over 70 percent want their consumption metered. This issue is elaborated in Section III.
5. Continue to create incentives to reduce the magnitude of losses in the system by: a) metering; b) creating incentives for households to reduce consumption and repair leaking plumbing; and c) creating incentives for RAJAC and RAT to reduce losses by disallowing profits on losses.
6. We recommend that the city and county government in cooperation with RAJAC and RAT undertake a market study of plumbing services in Iasi. Our results reveal that the absence of trained plumbers impairs associations' and households' ability to repair indoor plumbing.

Figure 1
Diagram of Water Flows Between Institutions in Iasi, Romania

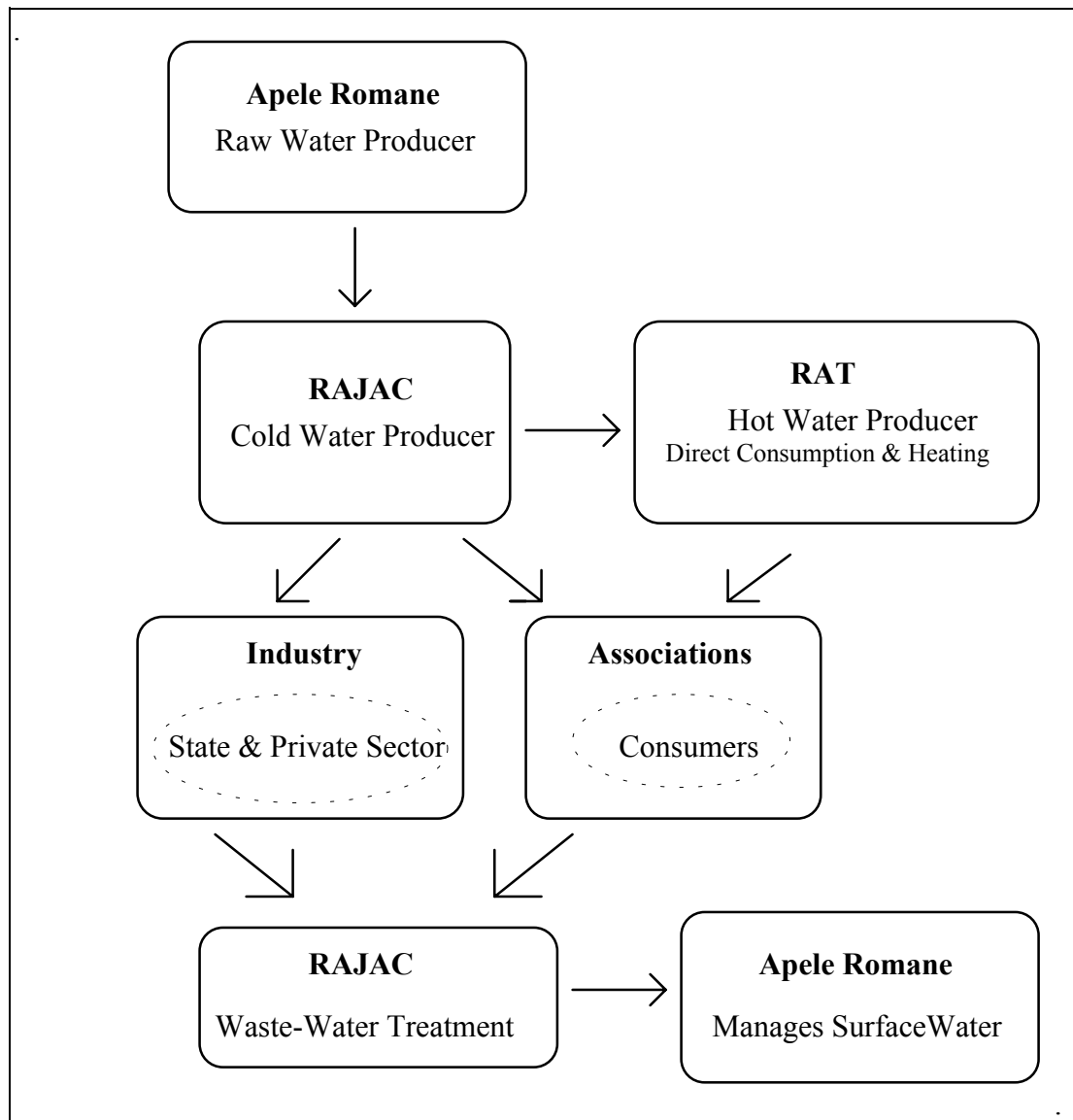
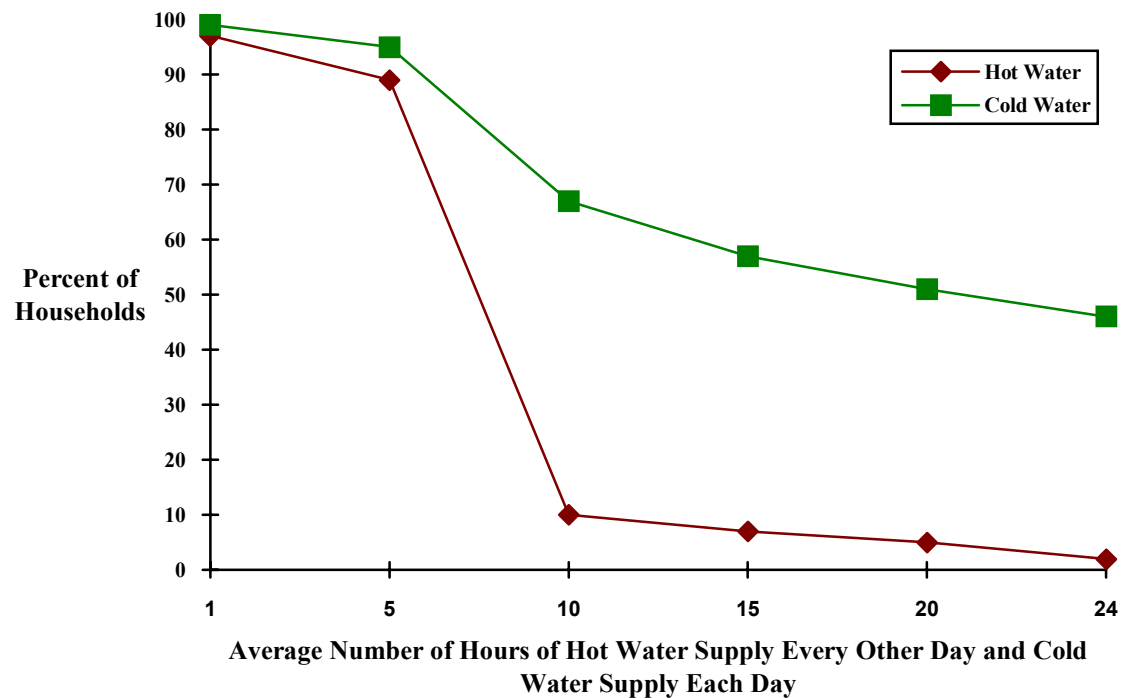


Figure 2
Frequency of Cold and Hot Water Supply Reported by Households



Source: HIID C4EP/Romania Survey, 1995

Figure 3
Trends in Monthly Bills for Hot and Cold Water & Sewerage for 1994-95
for a Family Living in the Center of Iasi, Romania (adjusted for inflation)

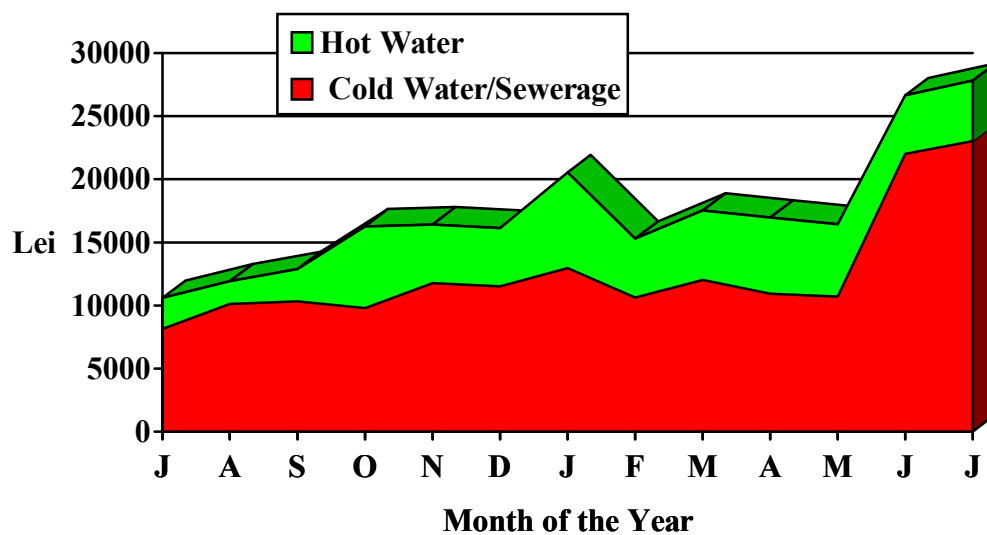


Table 1
Households' Willingness to Pay for Improved Cold Water Service
by Socio-Economic and Locational Characteristics

| Socio-Economic & Locational Variables | Percent of Sample | Mean WTP (lei) |
|--------------------------------------------------|--------------------------|-----------------------|
| Income (lei) | | |
| 0-100,000 | 17 | 4,385 |
| 100,001-200,000 | 55 | 5,121 |
| 200,001-300,000 | 19 | 9,549 |
| 300,001 & Upward | 9 | 10,000 |
| Education | | |
| Primary | 14 | 3,301 |
| Technical/Vocational | 35 | 5,358 |
| Secondary | 28 | 7,484 |
| University | 23 | 8,080 |
| Age | | |
| 19-30 | 16 | 7,721 |
| 31-40 | 24 | 7,690 |
| 41-50 | 30 | 6,883 |
| 51 & Upward | 30 | 3,893 |
| Household Size | | |
| 0-1 | 8 | 3,396 |
| 2-3 | 48 | 5,790 |
| 4 & Upward | 44 | 7,378 |
| Residence by Floor | | |
| 1 | 9 | 3,610 |
| 2-4 | 38 | 6,427 |
| 5-11 | 53 | 6,638 |

Source: HIID C4EP/Romania Survey, 1995

Table 2
Households' Willingness to Pay for Improved Hot Water Service
by Socio-Economic and Locational Characteristics

| Socio-Economic & Locational Variables | Percent of Sample | Mean WTP (lei) |
|--------------------------------------------------|--------------------------|-----------------------|
| Income (lei) | | |
| 0-100,000 | 18 | 3,482 |
| 100,001-200,000 | 56 | 3,708 |
| 200,001-300,000 | 18 | 5,741 |
| 300,001 & Upward | 8 | 6,885 |
| Education | | |
| Primary | 14 | 2,386 |
| Technical/Vocational | 34 | 3,814 |
| Secondary | 31 | 4,966 |
| University | 21 | 5,268 |
| Age | | |
| 19-30 | 18 | 5,946 |
| 31-40 | 22 | 5,275 |
| 41-50 | 27 | 4,738 |
| 51 & Upward | 33 | 2,407 |
| Household Size | | |
| 0-1 | 8 | 1,874 |
| 2-3 | 51 | 4,239 |
| 4 & Upward | 41 | 4,868 |
| Number of Floors in Building | | |
| 1 | 6 | 862 |
| 2-4 | 2 | 2,037 |
| 5-14 | 92 | 4,551 |

Source: HIID C4EP/Romania Survey, 1995

SECTION III:

An Evaluation of Switching to Pricing Policies Based on Metering: A Case Study of Iasi, Romania

1. INTRODUCTION

Water delivery systems across Central and Eastern Europe are plagued by several problems that only an improved pricing policy can address. Historically, socialist governments did not meter the consumption of households because their philosophy of entitlements presumed that the state would always have adequate water and financial resources. The folly of this presumption is now painfully obvious to households who suffer from falling service levels and rising service prices.

However, reforming water pricing policies means incurring the costs of implementing more comprehensive metering programs. Local officials must determine whether the benefits of adopting a more efficient pricing policy are greater than the costs of metering. If the benefits outweigh the costs, then these officials must decide how to finance the new policy. We will consider these questions in the context of the municipality of Iasi, Romania. Like many large cities in post-socialist Europe, Iasi's transition to democracy has meant coping with the institutional remnants of socialism, becoming more fiscally autonomous, and learning to do more with fewer resources. As we described in Section II, the water utility in Iasi currently uses a flat-rate pricing policy and suffers from high levels of water loss and inadequate financing.

There are two unusual circumstances in Iasi that make it an interesting case study of pricing policy reform. First, in other countries, utilities typically mandate metering programs because consumers will not voluntarily install meters, hoping instead that other consumers will meter first so that they can enjoy the benefits and avoid the costs. In Iasi, however, households perceive large private benefits and actively demand metering. Second, although most metering programs are paid for by consumers, they are financed by the water utility. In Iasi, however, because a recent loan from the European Bank for Reconstruction and Development (EBRD) prohibits the water utility from increasing its debt burden, we had to explore the possibility and practicality of a consumer-financed metering program. Our analysis suggests that the transition has created the potential for local officials to adopt and finance an innovative pricing policy where one would not have expected it.

The benefits of a comprehensive metering program arise from efficiency gains which develop because metering induces consumers to reduce both water losses and unnecessary water use. However, metering and pricing reform have the features of a public good leading to free-rider problems. The free-rider problem arises when a household resists switching to metered consumption (and long-run marginal cost pricing) in the hope that other households will switch so that it can benefit from lower costs without altering its consumption behavior. Because of this free-riding problem, consumers tend to adopt metering only when utilities mandate it. Unfortunately, utilities typically only implement such demand management policies when they need to delay the development of a costly or politically-sensitive water source. However, in Iasi we find that both the utility and households want to switch to a consumption-based pricing policy.

We have organized this Section as follows. In section 2, we explain how a long-run marginal cost pricing policy creates static and dynamic incentives for the efficient use of water, making it superior to the existing flat-rate pricing policy. In sections 3 and 4, we enumerate the ways that long-run marginal cost pricing will reduce the cost of water service in Iasi. In section 5, we reveal how features of the economic transition have encouraged households to demand the installation and use of meters in Iasi as measured by a contingent valuation survey. In section 6 and 7, we consider possible financing options for a metering

program, focusing primarily on the feasibility of a consumer-financed metering program. Finally, we conclude with several policy recommendations in section 8.

2. AN EVALUATION OF PRICING POLICIES

We advocate the use of three criteria when choosing pricing policies. First, the pricing policy should include in the price the production, distribution, maintenance, administrative and environmental costs if the service is to be financially sustainable. Second, the pricing policy should be statically efficient, meaning that households should equate their private value for the last unit of water with the social cost of producing that last unit of water. Third, a pricing policy should be dynamically efficient, meaning that it allocates more water to households who value it most and less water to households who value it least. As we discuss below, for a pricing policy to be dynamically efficient requires that the first two criteria be met and that local officials be able to vary price as water scarcity varies.

The key to understanding whether a pricing policy is efficient is to ask the question: “For this pricing policy, how does the household decide how much water to consume?” We compare two popular pricing policies, a flat-rate and a long-run marginal cost (LR-MC) policy, to illustrate the relative benefits of the latter policy.

2.1 A Flat-Rate Pricing Policy

When using a flat-rate policy, local officials calculate a household's monthly bill by dividing the total number of households by the total production, distribution and maintenance costs. How do households decide whether to consume an extra unit of water? A household realizes that for each extra unit of water it consumes, local officials will divide the cost of producing that extra unit by the total number of households in the city. In a large city like Iasi, the household knows it will pay almost none of the real cost of consuming that extra unit of water because the pricing policy distributes the cost of each extra unit of water among the other households. As a result, the household will keep using additional units of water until that last unit of water has no value to them. Notice that this pricing policy is statically inefficient because the household values that last unit of water less than the cost to society of producing that unit.

2.2 A Long-Run Marginal Cost (LR-MC) Pricing Policy

When using a LR-MC policy, local officials calculate a household's monthly bill in two steps. First, they divide the total quantity of water produced by the total cost of producing that water over a planning horizon to get the long-run marginal cost of producing each unit of water. Second, using meters, they measure the number of units of water consumed by each household and then multiply each household's actual consumption by the long-run marginal cost per unit.

How does a household decide whether to consume an extra unit of water? Now the household knows that if it consumes an extra unit of water it will have to pay the cost of producing that unit of water. If the household has to pay for the full cost of producing the water, it will keep consuming extra units of water until the value of the last unit of water it consumes is equal to the long-run marginal cost of producing that unit. This pricing policy forces the household to think about the cost to society of producing water when it decides how much water to consume.

2.3 A Comparison

First, because long-run marginal cost pricing is statically efficient, it satisfies households' preferences at the lowest cost possible. This may mean lower total production costs for the utility and lower monthly bills for households, while still meeting households' needs. Second, long-run marginal cost pricing could

be dynamically efficient if, during a water shortage, the utility can raise the price of water to reflect its scarcity, ensuring that households who value water more will have more of it than households who value it less.

3. EVALUATING THE PUBLIC BENEFITS OF METERING IN IASI

Because of the incentives described above, we can expect long-run marginal cost pricing and metering to yield several types of public benefits. RAJAC, the county-wide water utility in Iasi, would benefit from a metering program through: 1) reduced costs; 2) improved management; and 3) improved legal compliance and public relations.

RAJAC could reduce its total *production* cost in three ways. First, as we described earlier, long-run marginal cost pricing reduces the total quantity of water needed by reducing the amount of water demanded by each household. Second, it also creates an incentive for households to repair leaking plumbing in their homes, thereby reducing the amount of water lost. Third, this policy reduces the rate of growth in water consumption, thus reducing future capital costs by deferring the need for the development of new water sources.

RAJAC could improve its *management capacity* in three ways too. First, more meters will allow RAJAC to effectively identify the breaks in the network that cause water losses. Second, such a program could eliminate the high levels of non-payment if RAJAC (via the associations) could clearly identify non-paying households and target them for legal or other action. Third, if water became scarce, it would allow RAJAC to improve social welfare in Iasi by making households responsive to water scarcity through prices.

There are also *political and administrative reasons* why RAJAC should favor metering. First, since by law RAJAC is required to meter the consumption of the 60 percent of associations which do not currently have bulk meters, such a program would bring RAJAC into legal compliance. Second, through metering and pricing reform RAJAC could more credibly deflect growing claims by the electorate of unfair billing practices and demonstrate its commitment to an improved level of service. Third, RAJAC's acceptance of a recent EBRD loan has resulted in a schedule of price increases of over 400 percent. Given this rapid increase local officials will find it very difficult to approve unforeseen price increases due to network losses or increases in non-payment by households. Finally, the recent regional water shortage highlights RAJAC's need to control demand and reduce losses rather than increase its rate of extraction. In light of these factors, metering is likely to decrease RAJAC's administrative costs over time.

4. THE EFFECT OF FLAT-RATE PRICING ON HOUSEHOLDS IN THE PRESENCE OF LOSSES

To understand household preferences regarding billing, we carried out a survey of 1,218 households in Iasi. Over 68 percent of households in apartments and 54 percent of households in houses reported that they were dissatisfied with the way their monthly water bill was calculated. We asked households why they were dissatisfied. In apartments, 81 percent of households reported that they were charged for more water than they consumed, 13 percent reported that the price per cubic meter was too high, and 6 percent gave other reasons for their dissatisfaction. In houses, 71 percent reported that they were dissatisfied because they were charged for more water than they used, 9 percent said the price per cubic meter was too high, and 20 percent gave some other reason for their dissatisfaction. Households, therefore, appear to be dissatisfied because they believe that they are billed for more water than they use rather than because of price increases.

Interviews with association administrators and RAJAC confirmed that households are consistently charged for between 12 and 16 cubic meters per person per month, while the average consumption in Iasi and Eastern Europe is 8.9 and 7.9 cubic meters per person per month, respectively. Unfortunately, RAJAC has a disincentive to reduce these losses since it is entitled by law to a 5 percent profit on all revenues collected, including revenue which is collected on lost water.

4.1 Metering and Non-Payment

Equally important are households' perceptions that a metering program could protect them from bearing the cost of neighbors who do not pay their water bills. In our survey, over 83 percent of households reported that non-payment by neighbors had a negative impact on service levels and quality in their association. Households recognize that non-paying neighbors: 1) decrease service quality by reducing funds for the maintenance of the distribution network; 2) increase their share of the association's water costs; and 3) increase the probability that RAJAC will cut off water service to the entire association. Part of this problem is due to the poor performance of association administrators at bill collection from non-paying households; only 28 percent of households rated as "good" the performance of their association administrator at this task.

Over the long run, we would expect the cost reduction and efficiency gains of LR-MC pricing to save consumers a substantial amount of money. However, the diffuse nature of these benefits makes quantifying them difficult, and would require detailed cost information, assumptions about consumers' demand for water, and the use of mathematical simulations.

5. HOUSEHOLD WILLINGNESS TO PAY FOR IMPROVED METERING

In light of the public good properties of a metering program, it is extraordinary that households perceive that the private benefits are large enough to be willing to pay for metering. In a contingent valuation exercise described below, over half of the households surveyed in Iasi were willing to pay the full price of purchasing and installing meters on their stairwells or in their dwellings. The average household was willing to pay a lump sum of 11,500 lei (or \$5.50) to meter their stairwell. For the more favored, but vastly more costly option of metering individual dwellings, the average household was willing to pay a lump sum of 12,000 lei (or \$6.00) and a monthly sum of 4,100 lei (\$ 2.00) for five to ten years. Our statistical analysis showed that younger, richer households, who were aware of both free-riding by neighbors and the cost of the service, were willing to pay the most for metering.

5.1 Will Improved Metering Really Generate Sizable Private Benefits?

We can be sure the public benefits from metering will be large in Iasi, but are households correct in assuming that metering will generate sizable private benefits? This depends on local conditions and whether local officials supplement a metering program with additional policy reforms. First, consider household expectations that metering will lead to cost savings because RAJAC will not be able to charge them for lost water. If the total losses in the water system are not reduced then there will be no cost savings to households - RAJAC will simply raise the price per cubic meter of water to cover production costs. However, there are reasons to believe that losses can be substantially reduced when a comprehensive metering program is coupled with the network repair financed by the EBRD loan.

Of the 50 percent losses in the system, RAJAC claims that only 25 percent occur in its network, suggesting the other 25 percent occur in households' faulty plumbing. RAJAC is using part of an EBRD loan to reduce losses in the network with the possibility of reducing losses from 25 percent to 10 to 15 percent. A metering program will induce households to not only use less water, but also repair and maintain their indoor plumbing. Based on the experience of other countries, metering may induce a

reduction in consumption and indoor losses from 25 percent to 5 to 8 percent. Over the coming years, water losses could be cut in half - the largest drop occurring in households where repair costs per cubic meter of water lost are lowest.

Next consider whether metering will protect households from neighbors who do not pay their bills. Unless local officials reduce the incidence of non-payment or subsidize the water bills of these households, the cost of producing water for these households will be borne by the public through higher water rates. However, we believe that the central and local governments should initiate two types of programs based on metered consumption. First, to reduce the incidence of non-payment, local officials should initiate a stricter program of monitoring and enforcement of bill collection at the level of the association with the support of RAJAC, the Mayor's office, and the courts. Second, given that over 30 percent of households in Iasi are pensioners on low fixed incomes, a welfare program of selective water bill subsidization should be developed with strict guidelines on eligibility. Using an increasing block rate tariff, RAJAC could implement a cross-subsidization program in which larger (richer) consumers subsidize smaller (poorer) consumers. In tandem with long-run marginal cost pricing, these programs should ease the burden of the growing number of non-paying households on other water rate payers.

6. THE COST AND RELATED OBSTACLES OF A METERING PROGRAM IN IASI

Local officials face substantial institutional and financial obstacles to implementing long-run marginal cost pricing based on metered consumption. First, RAJAC must significantly expand its capacity to read and maintain the meters. Second, if the utility were to take on these responsibilities, the role of the associations as a mediator between the utility and the consumer would need to be reconsidered. Under current laws, the association administrator would be responsible for reading meters in either stairwells or individual dwellings. However, many households do not trust the associations to function effectively. Over 49 percent of households reported that they wanted to bypass the association administrator and pay their water utility directly as they do when paying the energy utility.

Third, to install meters in either households or stairwells local officials will need to surmount engineering constraints imposed by the plumbing designs. These constraints will be costly to overcome. We considered the cost of metering both stairwells and individual dwellings. The per family costs will be lowest for stairwells, but will probably vary greatly due to site-specific retrofitting costs from 15,000 lei to upwards of 100,000 lei per family in 1995. In the case of metering households, the configuration of plumbing in apartment buildings will require several meters per household. We estimate that the average cost of purchasing and installing meters for households in apartments is 430,000 lei and in houses is 140,000 lei in 1995.

7. WHO SHOULD FINANCE AN IMPROVED METERING PROGRAM?

Even if the public and private benefits of switching to a long-run marginal cost pricing policy are greater than the costs, local officials face the question of how to finance the purchase and installation of water meters. The water utility, RAJAC, is prohibited as a condition of the EBRD loan from assuming any further debt. Similarly, although many households expressed a preference for metering, few would actually be able to afford the cost of metering without financing. However, given the magnitude of the expected public benefits and the strength of household preferences for an improved metering program, we consider *voluntary* consumer financing schemes that might alleviate the public capital shortage.

7.1 Consumer Preferences for Financing Plans

In this portion of our analysis, we assumed that the institutional and engineering constraints associated with metering could be overcome and that households' financial constraints would determine their

willingness to pay for such a program. First, for households in apartments, we offered the option of metering their own stairwell. Second, we offered households in apartments and houses the opportunity to meter their family's consumption. Only households that were dissatisfied with the way their water bill was calculated were asked about their willingness to pay for new metering programs. We found that over 71 percent of these households (in apartments) were willing to pay a one-time fee of 20,000 lei to have their association administrator purchase and install a water meter on their stairwell or for their block. Slightly more households (74 percent) were willing to pay to meter their dwelling.

7.2 Financing to Meter Family Dwellings

Our analysis took the form of a contingent ranking and valuation of households' preferences for consumer financing packages under alternative hypothetical scenarios. Table 1 presents the characteristics of the four consumer credit packages we presented to the 71 percent of all surveyed households who reported dissatisfaction with the way their bill was calculated. Although every financing option is based on a real rate of interest of 10%, each varies in the size of its down payment and monthly payment and the duration of its repayment period.

Table 1 also presents households' ranking of the three most preferred options. Less than three percent of households chose option I, in which households had to pay the full cost of metering up front. Option IV was the most preferred by the majority of households, followed by option III and then option II, revealing that households generally preferred smaller down payments and monthly payments and a longer repayment period. Not surprisingly, households with greater cash flow constraints (i.e. poorer, older households with relatively fewer household members employed and relatively more children) chose option IV (the option with the smallest down payment and monthly payments) over the other options.

We did not assume that because a household ranked an option first they would actually accept it. Once a household had ranked the options, we asked each household if they were willing to pay for meters given their preferred financing plan. We found that 74 percent were willing to pay for meters when offered their first choice of consumer credit options. Slightly less (62 percent) were willing to pay for meters when offered their second choice of consumer credit options. Our statistical analysis showed that younger, richer households, who were aware of both free-riding by neighbors and the cost of the service, were more willing to pay for their first and second financing options.

8. CONCLUSIONS AND POLICY RECOMMENDATIONS

Households are willing to provide considerable capital under either of the two proposed metering programs. Aggregating over the entire population in Iasi, households were willing to pay a lump sum of 1,800,000,000 lei (\$923,000) to meter stairwells. To meter a family dwelling, households were willing to pay a lump sum of 1,900,000,000 lei (\$962,000) and 650,000,000 lei (\$327,000) per month until the cost of purchasing and installing the meters was recovered. Household demand for meters is likely to grow as water losses and water prices continue to rise and non-payment problems continue due to hard economic times.

Based on the foregoing analysis, we make the following observations and recommendations:

- Because households are unaware of the efficiency gains and prone to free-riding behavior, we should interpret a household's willingness to pay for meters as a manifestation of the *perceived* size of the private benefits. While we did not quantify the public benefits, we have enumerated them and suggested they would be large. Our quantification of the relatively large private benefits to households underscores the potential of metering programs. However, we recommend that RAJAC

undertake the analysis needed to estimate the magnitude of the public benefits from improved metering since this would indicate the amount of resources worth allocating to a metering program.

- We recommend that local officials, lead by RAJAC, begin by developing a program to meter stairwells and, after successful implementation, turn to the more technically and financially challenging program of metering individual dwellings. In each case, however, local officials should be strategic in their selection of neighborhoods or apartment blocks to meter. They should first identify and target areas where the cost of installation is lowest and where household demand is highest. In the future, officials can address the areas of high cost and low demand.
- Our results suggest that household demand for meters in stairwells may be large enough to pay for installation up front when engineering constraints are few and, thus, the costs are low. To identify these win-win situations, associations must assess the cost of installing a stairwell meter and their internal willingness to pay for this improvement. Local officials could establish a city-wide program to assist association administrators in this task by identifying: a) qualified plumbers to assess the installation costs; b) a set of suppliers of meters and associated standards; and c) a standard procedure that could be used in every association to gauge internal demand.
- We also found that even when households are unable to pay the entire cost of metering up-front, over half of households would be willing to take out and repay a loan. Our results suggest that the average household is willing to bear monthly payments of up to 7,000 to 10,000 lei per month (\$3.50 to \$5.00). If local officials consider long-term financing, they should involve an outside organization or firm that has experience managing consumer credit projects. Such expertise will be essential when designing loan packages, evaluating loan requests, obtaining the needed "seed" capital to initiate the program, and managing loan collections and defaults.
- The water utility, RAJAC, and the associations must come to an agreement on who will be responsible for reading meters and billing. One model for this process is for RAJAC to continue to issue one bill to an association and have the administrator read the stairwell or dwelling meters and issue bills. A second model is for RAJAC to accept all responsibility for reading meters and billing customers. Under either model, local officials must establish a procedure for: a) identifying and mitigating losses within an association and b) dealing with chronic non-payment problems.
- National and local officials should promulgate new building codes that require all structures to meter individual businesses or households. Such laws would prepare the way for the inevitable construction boom that will follow an upswing in the per capita income of Romanians. They would also ensure that businesses and residents can enjoy the benefits of long-run marginal cost pricing policies in the future.

Table 1**A Description of the Four Financing Options and Households' Ranking of Each Option^a**

| | Option I | Option II | Option III | Option IV |
|----------------------------|-----------------|------------------|-------------------|------------------|
| Characteristics | | | | |
| Repayment Period (years) | 0 | 3 | 5 | 10 |
| Monthly Payment (lei) | 0 | 13,300 | 9,700 | 6,800 |
| Down Payment (lei) | 430,000 | 60,000 | 40,000 | 20,000 |
| Households' Ranking | | | | |
| First Choice % | 3 | 14 | 11 | 72 |
| Second Choice % | 2 | 8 | 84 | 7 |
| Third Choice % | 2 | 78 | 4 | 16 |

a. Based on the 71 percent of households in the sample who were dissatisfied with methods of billing currently in use.

SECTION VI:

Household Demand for Improved Solid Waste Services: A Case Study of Iasi, Romania

1. INTRODUCTION

Solid waste service is a critical part of maintaining a high level of urban environmental quality in Iasi. Policy makers should carefully evaluate the provision of solid waste service in order to ensure that households receive an adequate level of service. To assist in this evaluation, we undertook a study of households' demand for improved solid waste service. We began by collecting information about the methods and cost of solid waste collection and disposal from CITADIN, the city-wide utility that provides the service. We then surveyed a random sample of 1,218 households in order to collect information about waste disposal practices and preferences and willingness to pay for improved solid waste service.

We found that households were willing to pay for an improvement in their solid waste service, which accorded with CITADIN's goal of increasing service levels as funds become available. Unlike the water utilities, the lighter capital requirements of solid waste service mean that CITADIN can alter its service levels quickly by simply introducing a greater number of trucks and shortening its collection rotations. Perhaps our most surprising finding was that households' major complaint was not about CITADIN's current level of service or its cost, but rather the failure of neighboring households to responsibly transport their waste from their apartment and properly dispose of it in the waste bin. Therefore, although CITADIN does need additional capital equipment, reforms should also focus on improving households' waste disposal practices in the consumer collectives known as associations. Some of the heterogeneity in household preferences for local sanitation will diminish as the residential real-estate market develops and households sort themselves into like-minded neighborhoods.

We organize this Section in the following way. In section 2 we describe the institutional structure of solid waste provision. We follow in sections 3 and 4 with a description of household practices and their evaluation of solid waste service. We then discuss households' willingness to pay for both households that reside in apartments and those in houses in section 5 before making our policy recommendations in section 6.

2. INSTITUTIONAL BACKGROUND

Sanitation services are provided by CITADIN, a city-wide utility, which also maintains city parks, signage, public graveyards, and city rental properties. CITADIN's sanitation services are divided into street cleaning and solid waste collection and disposal. Most of CITADIN's clients are either associations or businesses with which it establishes contracts, although it also provides houses in Iasi with solid waste service. Each contract specifies the number of waste containers each association or business will receive and the schedule of collection. Associations are charged on a per person basis. At the time of the study, the fee was 457 lei per person per month or 1,416 lei per family per month for the average family of 3.1 members. Collection from communal bins is common for associations and businesses, while some direct curbside collection occurs for houses.

CITADIN employs approximately 280 workers in its collection, transfer, and disposal operations. The Director of CITADIN's solid waste division reported that its primary production constraint is the number of waste bins available to it. Currently, CITADIN operates with 1,250 bins, but the Director indicated that approximately 3,000 waste bins are needed to meet Iasi's needs. For purposes of administration, solid waste service is divided into 8 zones within which waste is collected and transported to one of three

transfer stations. From these transfer stations 23 trucks haul the waste to the city sanitary landfill. Although improvements in this landfill continue to be made, it is effectively full and plans for siting a new landfill are well underway.

3. HOUSEHOLD PRACTICES

The average household makes 5 trips a week to their waste bin or chute. In our sample of households residing in apartments, approximately 94 percent of households disposed of waste in containers, while only 6 percent used chutes in apartments. When we asked which member of the family transported waste to the bins, 58 percent of households reported that adults performed this chore, 26 percent reported that children did, and 16 percent reported that senior citizens did.

In our sample of households residing in houses, 35 percent reported that they had curbside collection, 36 percent reported that they disposed of their waste in a bin, 5 percent reported dumping their waste in a public area, and 20 percent reported that they used some other method of waste disposal. Of those households who used bins, we asked if the bin was designated for their use: over 66 percent of households said that it was not designated for their use, while 33 percent said it was.

Some households participate in recycling programs initiated by association administrators; however, there is no city-wide recycling program. While further analysis needs to be done to determine where recycling would minimize CITADIN's costs, 82 percent of households said they would be willing to pre-sort waste if bins were provided to the association.

4. HOUSEHOLDS' EVALUATION OF SOLID WASTE SERVICE

Effective solid waste service depends on the cooperation of CITADIN, the associations, and households. CITADIN must provide and empty bins frequently and ensure that the design of bins effectively contains the waste prior to collection. In addition to their other tasks, association administrators must create incentives for households to transport their waste to the bins, rather than to other public areas. However, in the final analysis it is up to households to responsibly transport their waste to the designated bin.

We asked households to evaluate features of their solid waste service. Table 1 presents our results. Households' evaluation of the frequency of bin pick-up was mixed; 30 percent of households rated the frequency of container pick-up as poor, while 35 percent rated it as adequate, and 35 percent rated it as good. This appears to confirm CITADIN's own assessment of the system which was that the frequency of bin collection could be improved.

When we explored dimensions of service quality, we found that over 60 percent of households rated the proximity of the bin to their household as good; however, almost 40 percent of households rated cleanliness around the bins as poor. While it is clear that CITADIN's siting decisions can be commended, it is less clear what causes, and who should be responsible for, the unsanitary conditions around the bins. Litter around bins may be the result of bins overflowing due to infrequent emptying, bin design which allows wind to disperse collected garbage, or inadequate clean-up operations when CITADIN collects the bins. However, it is also possible that these unsanitary conditions around the bins may be the fault of households who do not carefully place their waste in the containers.

When we explored the communal features of solid waste service we found some evidence to support this latter point. Over 40 percent of households rated their neighbors' disposal practices as poor and 24 percent rated them as only adequate. This presumably means that households do not feel that neighbors responsibly handle and transport their waste to the bins. Supporting this conjecture is the fact that households tended to rate the presence of litter in the apartment building itself as a problem. Over 36

percent of households reported that litter was poorly controlled around their apartment building and 29 percent rated it only adequate. Given the high population density in Iasi and households' evaluations, it is not surprising that the local impact of solid waste is modulated by the collective behavior of neighbors. Under these conditions the provision of solid waste service in apartment buildings is truly a cooperative venture between the households and CITADIN.

Finally, we explored the services provided by the association and its administrator in support of solid waste service. Administrators perform at least three types of services. First, they regulate households' disposal practices through social sanctions. Second, they respond to service problems within the association. Over 36 percent of households rated their administrator as poor and 32 percent rated them only adequate in terms of responsiveness to such problems.

Third, administrators act as financial intermediaries between the utility and the households. While 30 percent of households rated their administrators as poor at bill collection, administrators were rated well overall at processing the bills. Part of administrators' poor rating for bill collection arises from the problem of non-payment by households. Over 83 percent of households reported perceiving a negative impact to their service level and quality due to households who did not pay their bills on time. The Director of CITADIN confirmed that a substantial minority (30 percent) of households did not pay their bills each month and that this did negatively affect CITADIN's level of operations. When we asked households if they were willing to bypass their administrator and pay CITADIN directly, 49 percent said they would be willing to pay CITADIN directly. While this may eliminate some of the problems associated with the intermediary role of the associations, it is not clear how this would improve the non-payment problem without additional policies in place.

5. HOUSEHOLDS' WILLINGNESS TO PAY FOR IMPROVED SOLID WASTE SERVICE

We next asked households what level of service they would like CITADIN to provide and how much they would be willing to pay for improvements in solid waste service. To do this, we included a contingent valuation component for improved solid waste service in our survey of households. We questioned both households residing in apartments and those residing in houses about improvements in solid waste service and their willingness to pay for improvements.

5.1 Households in Apartments

The improved service that we offered households in apartments included a doubling of the number of containers and an increase in the frequency with which CITADIN emptied the bins. As a result of these improvements, households were told they could expect: 1) fewer flies and odors around containers; 2) less litter around containers; 3) more frequent emptying (less on-site storage) and, in some cases; 4) shorter distances to walk to containers.

This description and the willingness-to-pay questions were presented to the 52 percent of households who rated their solid waste service as poor or adequate overall. Of these households, about 45 percent were willing to pay nothing for improved solid waste service, while 55 percent were willing to pay a positive amount. Households' average willingness to pay for improved solid waste service was 1,677 lei per family per month. This exceeds the average household's current monthly expenditure on solid waste service (1,416 lei) by 260 lei per family per month. This suggests that for a majority of households, not only can the average charge per person be increased slightly in return for a higher level of service, but to do so would improve households' welfare.

Households who were willing to pay nothing for improved solid waste service were asked why they were unwilling to pay. Over 37 percent reported they could not afford it, 31 percent of households did not

believe the service could actually be improved, and 24 percent said they felt the current level of service was adequate. The percentage of households who did not believe the improved service could be provided was much higher for solid waste service than for cold and hot water service where only 6 percent of households held this belief. This may be because households recognize that improved solid waste service is more dependent on collective action and doubt that improved collective action is possible. On the other hand, it may reflect households' lack of faith in CITADIN's ability to upgrade service levels.

5.2 Households in Houses

Households in houses were offered improved solid waste service that consisted of punctual curbside waste collection. Households were told that each week on a designated day a CITADIN crew would come by to collect their waste. The household was to be responsible for having its waste bagged or in an appropriate container at the designated time. Recall that only a minority (33 percent) of households previously had curbside collection service. This description and the associated willingness-to-pay questions were presented to the 63 percent of households who rated their solid waste service as poor or adequate overall.

Of these households, 63 percent were willing to pay a positive amount, while 37 percent were not willing to pay anything for improved solid waste service. Households' average willingness to pay was approximately 1,350 lei per family per month. This is close to, but less than, households' average current expenditure of 1,416 lei per family per month. This decrease in willingness to pay over apartments is probably due to the fact that households in houses have a greater variety of substitute sites for the disposal of their waste than do apartment dwellers.

We subjected households' willingness to pay to several types of statistical analysis and found that it was positively and significantly correlated with levels of income and education as well as household size and the number children in the household. We also found a household's willingness to pay to be negatively and significantly correlated with a respondent's age and the current level of satisfaction with their solid waste service. See Table 2.

6. SUMMARY AND POLICY RECOMMENDATIONS

Based on the above analysis, we recommend the following policy reforms be considered by CITADIN and the municipality of Iasi.

1. *Develop policies to address non-payment by households and associations.*
The financial sustainability of solid waste service is threatened by the fact that 30 percent of the beneficiaries of solid waste service do not pay their bills. Households see this problem as seriously affecting the quality of their service by decreasing the resources CITADIN has at its disposal to provide the service. We recommend that CITADIN unite with other utilities, association administrators, and the Mayor's office to address the problem of non-payment. Mechanisms that households felt would resolve this dilemma included: 1) improved employment opportunities (32 percent); 2) greater vigilance by the administrator (30 percent); and 3) stronger legal action against delinquent households (21 percent). In our opinion, none of these actions will be effective without the oversight or involvement of the municipal government.
2. *Consider a modest increase in service levels and user fees.* Based on our analysis, CITADIN should consider raising its service levels and its user charges. Specifically, we recommend considering increasing the number of bins available to associations and households in apartment buildings. Our analysis suggests that over 50 percent of households living in apartments would be willing to pay, on

average, an additional 260 lei a month for the improved level of service described above. We recommend that CITADIN undertake an analysis of the cost of such an improvement.

3. *Adopt differential pricing for service to houses versus apartment buildings.* CITADIN currently uses the same average-cost estimate per person for solid waste service regardless of whether a household resides in an apartment or a house. Since the actual cost of providing the same level of service to households in apartments is less than that of households residing in houses, CITADIN should consider re-estimating its charges so they reflect the actual cost of service provision. Given that currently less than 8 percent of households reside in houses, this adjustment in the charges may not seem important. However, as the percentage of households residing in houses grows, as it surely will in the future, the current method of estimating per person charges means that increasingly apartment dwellers will subsidize the cost of solid waste service to houses.
4. *Help improve the functioning of associations.* We suggest several possible improvements in the operation of associations. First, the Mayor's office or some other authority might host a seminar for association administrators on methods for improved bill collection and approaches to dealing with non-payment by households. Such a seminar might also provide an opportunity to discuss proper accounting practices and penalties for violations of these practices. Second, CITADIN or a non-governmental organization might host a seminar for association administrators on motivating and monitoring households in order to improve their waste handling and disposal practices. Third, we recommend that administrators itemize the costs of the services that the association passes on to households. Currently less than 10 percent of households know how much they pay for solid waste service. Because households are not aware of how much they pay for this service they cannot evaluate the appropriateness of the level of service given the price and express their preferences to elected representatives who ought to help determine service levels and user charges.

Table 1**Households' Evaluation of Solid Waste Service^a**

| | Poor (%) | Adequate (%) | Good (%) |
|-----------------------------------------|-----------------|---------------------|-----------------|
| Service Delivery | | | |
| Frequency of Container Pickup | 30 | 35 | 35 |
| Service Quality | | | |
| Cleanliness around Container | 39 | 29 | 32 |
| Distance to Container | 14 | 24 | 62 |
| Communal Features | | | |
| Neighbors Disposal Practices | 42 | 24 | 34 |
| Litter Around apartment Bldg. | 36 | 29 | 35 |
| Institutional Services | | | |
| Admin. Responsiveness to Problems | 36 | 32 | 33 |
| Admin. Effectiveness in Bill Collection | 30 | 42 | 28 |
| Admin. Effectiveness in Bill Processing | 18 | 48 | 34 |

a. Presented are households' evaluations of the delivery, quality, and institutional features of their solid waste service. This data comes from the HIID C4EP/Romania Survey, 1995.

Table 2
Households' Willingness to Pay for Improved Solid Waste Service
by Socio-Economic Characteristics

| Socio-Economic Variables | Percent of Sample | Mean WTP (lei) |
|---------------------------------|--------------------------|-----------------------|
| Income (lei) | | |
| 0-100,000 | 14 | 1,097 |
| 100,001-200,000 | 56 | 1,226 |
| 200,001-300,000 | 20 | 1,908 |
| 300,001 & Upward | 10 | 2,291 |
| Education | | |
| Primary | 11 | 966 |
| Technical/Vocational | 33 | 1,151 |
| Secondary | 31 | 1,622 |
| University | 25 | 1,834 |
| Age | | |
| 19-30 | 20 | 1,920 |
| 31-40 | 21 | 1,575 |
| 41-50 | 27 | 1,505 |
| 51 & Upward | 32 | 1,024 |
| Household Size | | |
| 0-1 | 7 | 850 |
| 2-3 | 52 | 1,384 |
| 4 & Upward | 41 | 1,641 |
| Children in Household | | |
| 0 | 32 | 1,049 |
| 1-2 | 56 | 1,609 |
| 3 & Up | 12 | 1,764 |

Source: HIID C4EP/Romania Survey, 1995